ANNUAL REPORT FOR 2003

White's Store Mitigation Site
Dare County
Project No. 8.T051401
TIP No. R-2551WM

Prepared By:
Office of Natural Environment & Roadside Environmental Unit
North Carolina Department of Transportation
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SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year at the White's Store Mitigation Site. The site was constructed and originally planted in May 2001 and was designed as saw grass marsh restoration. The entire site serves as mitigation for impacts associated with construction of US 64-264.

Two groundwater-monitoring gauges were installed on the site in March 2002. At the request of the resource agencies, these two gauges were reset in May 2003 as surface water gauges that record data in 3-hour intervals. The site is a wind driven tidal system; therefore, success will be measured by the occurrence of inundation (occasional flooding is required for success). For the 2003-year, the two surface gauges exhibited frequent flooding on the site. Thus, the White's Store Mitigation Site fulfilled the hydrology success requirement.

Following initial vegetation failure, the site was replanted in May 2002. Success guidelines state that at least 50% of the individual plants must survive after five years or that the planted species must show a minimum 75% aerial coverage on the site. Monitoring in August 2002 indicated that minimal planted vegetation was surviving; therefore, the entire site was tilled and replanted in April 2003. The site is experiencing difficulty achieving success with respect to the saw grass replanting. It appears that an *Echinochloa* species is covering the majority of the site.

The site will be surveyed this year to ensure that the elevation is the same as the reference site. NCDOT will also take soil samples at the reference site and the mitigation site to compare the soil conditions.

Based on the monitoring results for the 2003 growing season, NCDOT proposes to continue hydrologic and vegetation monitoring at White's Store Mitigation Site.

1.0 INTRODUCTION

1.1 Project Description

The White's Store Wetland Mitigation Site is located west of Manns Harbor in Dare County (Figure 1). Built in early 2002, the site serves as mitigation for impacts associated with US 64-264 construction (USACE Action ID No. 199502334). The site was designed to provide 0.21 acres of saw grass marsh mitigation.

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted for a minimum of five years or until the site is deemed successful. The site is a wind driven tidal system; therefore it will be deemed successful when the site demonstrates occasional inundation. The following report details the results of hydrologic and vegetative monitoring during 2003 at the White's Store Mitigation Site.

Included in this report are analyses of both hydrologic and vegetative monitoring results, as well as local climate conditions throughout the growing season.

1.3 Project History

May 2001	Site Constructed
May 2001	Site Planted
August 2001	Vegetation Monitoring (1 yr.)
March 2002	Monitoring Gauges Installed
March - November 2002	Hydrologic Monitoring (1 yr.)
May 2002	Site Replanted
August 2002	Vegetation Monitoring (1 yr. Restart)
November 2002	Site Treated for Phragmites
April 2003	Site Tilled
April 2003	Site Replanted
September 2003	Vegetation Monitoring (1 yr. Restart)
October 2003	Site Treated for Phragmites
March - November 2003	Hydrologic Monitoring (2 yr.)

Figure 1. Site Location Map

1.4 Debit Ledger

The site was designed to serve as mitigation (entirely) for US 64-264 construction, Project TIP No. R-2551, State Project No. 8.T051401. The 1.4-acre saw grass marsh restoration site provides mitigation for 0.21 acres of impacts from the construction of US 64-264.

2.0 HYDROLOGY

2.1 Success Criteria

There are not written success criteria for the White's Store Mitigation Site. The hydrologic monitoring aspect involves the use of surface water gauges. The site is a wind driven tidal system; therefore, it will be deemed successful when the site demonstrates occasional flooding. Groundwater monitoring is not required on this site (tidal system).

2.2 Hydrologic Description

The site was constructed by grading to a natural wetland elevation in order to replicate the hydrology of adjacent emergent communities that are also used as a reference ecosystem. Groundwater and rainfall are the primary hydrologic influences for the site. Two groundwater-monitoring gauges were installed on the site in March 2002. At the request of the resource agencies, these two gauges were reset in May 2003 as surface water gauges that record data in 3-hour intervals (Figure 2).

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The resource agencies in conjunction with NCDOT decided that the federal wetland success criteria guidelines did not pertain to the White's Store Mitigation Site, since it is a wind driven tidal system. It was determined that in order for the site to achieve hydrologic success, it must exhibit occasional surface flooding.

2.3.2 Climatic Data

Figure 3 represents an examination of the local climate in comparison with historical data in order to determine whether 2003 was "average" in terms of climate conditions. The two lines represent the 30^{th} and 70^{th} percentiles of monthly precipitation for Manteo, NC. The bars are monthly rainfall totals for November 2002 through August 2003. There was no rainfall data available for (September-November). The historical data was collected from the State Climate Office of North Carolina.

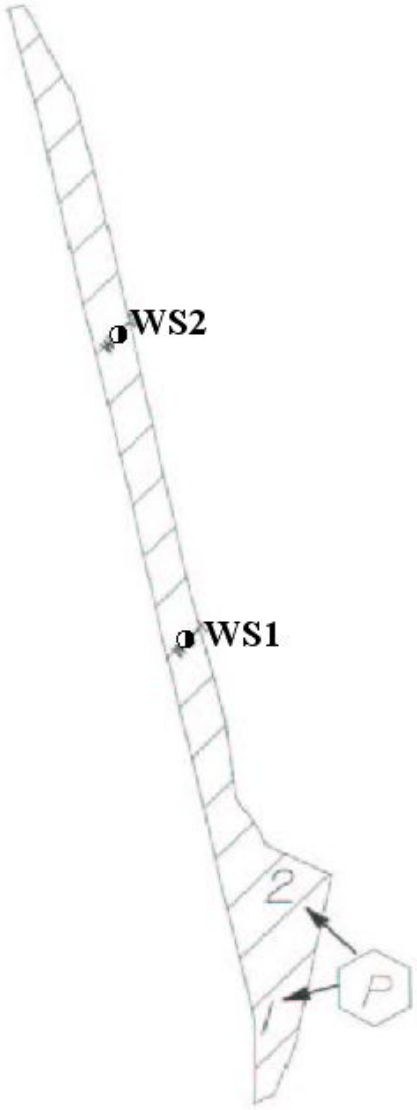


Figure 2. Gauge Location Map

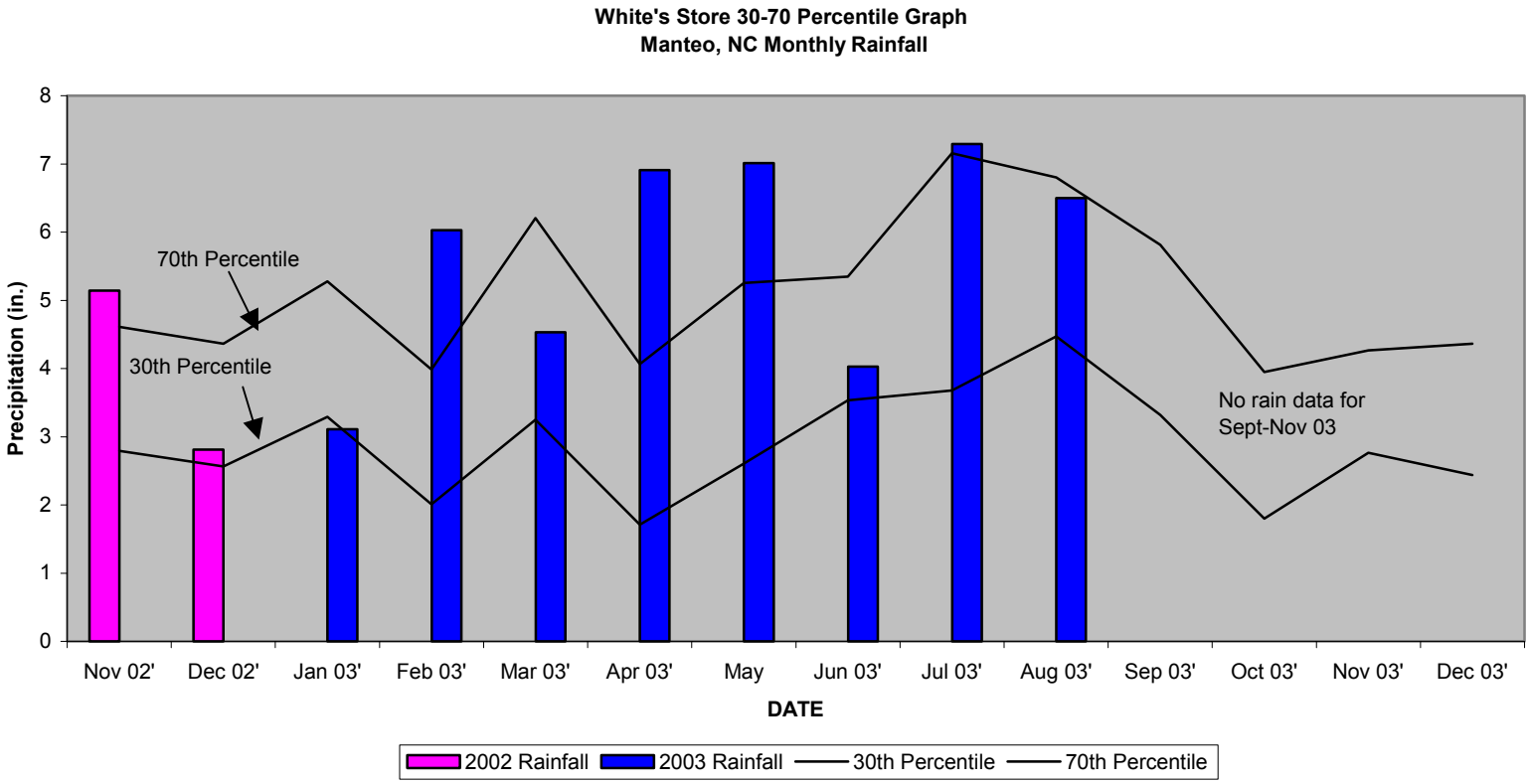
Not to Scale

For the 2003-year, January and November experienced below average rainfall. The months of December (02'), March, June, August, and October all recorded average rainfall for the site. November (02'), February, April, May, July, and September experienced above average rainfall. The rainfall data from the onsite rain gauge was used for the months of September-November. Overall, 2003 experienced an average to above average rainfall year.

2.4 Conclusions

The existing groundwater gauges were reset to begin recording as surface gauges in May 2003. Both surface gauges met the success criteria showing frequent flooding throughout the growing season. NCDOT proposes to continue hydrologic monitoring at White's Store Mitigation Site.

Figure 3. 30-70 Percentile Graph



3.0 VEGETATION: WHITE'S STORE MITIGATION SITE (YEAR 1 MONITORING)

3.1 Success Criteria

The vegetative marsh success of the wetland site will be determined in accordance with NMFS Guidelines. Monitoring plots found to be located within the open water channel will not be evaluated, and will not count in the final count of plots. The vegetation component of the wetland site will be deemed successful if the following criteria are met:

1. At year five, the average of all plots should have a scale value of 5 (75% vegetative cover) consisting of wetland herbaceous species, not including any invasive species.
2. A minimum of 70% of the plots shall contain the target (planted) species.

3.2 Description of Species

The following species was planted in the Wetland Restoration Area:

Cladium jamaicense, Saw Grass

3.3 Results of Vegetation Monitoring

Table 1. Vegetation Monitoring Statistics

Plot #	Scale Factor	*Cladium jamaicense*	Frequency	Comments
1	3.0			Cattail
2	3.0			Cattail
3	1.0			*Scripus* sp.
4	2.0			*Echinochloa* sp., *Pluchea* sp.
5	4.0			*Scripus* sp., Jointweed
6	5.0			*Juncus* sp.
7	3.0			Cattail, *Scirpus* sp., *Echinochloa* sp.
8	4.0			*Scirpus* sp., *Echinochloa* sp.
9	2.0			*Juncus* sp., *Echinochloa* sp.
10	4.0			Cattail, Jointweed, *Echinochloa* sp.
11	4.0			Cattail, *Echinochloa* sp.
12	0.0			Open Water
13	0.0			Open Water
14	2.0			Jointweed, *Echinochloa* sp.
15	0.0			Open Water
16	5.0			*Juncus* sp.
17	2.0			*Echinochloa* sp.
18	4.0			Jointweed, *Echinochloa* sp., *Juncus* sp.
19	3.0			*Echinochloa* sp.
20	4.0			*Scirpus* sp.
21	1.0			*Scirpus* sp., *Echinochloa* sp., *Sagittaria* sp.
22	4.0			Cattail, *Echinochloa* sp.
23	5.0			Jointweed, *Juncus* sp., Woolgrass, Phragmites
24	3.0			*Echinochloa* sp., Jointweed
25	4.0			Cattail, *Scirpus* sp.
26	5.0			*Echinochloa* sp.
27	5.0			Cattail, *Scirpus* sp., Jointweed
28	5.0			Cattail, *Echinochloa* sp., Phragmites
29	0.0			Open Water
30	5.0			*Juncus* sp., *Echinochloa* sp.
Frequency (Percentage of Plots with Desired Species)			11.5%	
Sum Scale Value			92.0	
Total Number of Plots			26	
Vegetative Cover (Scale Value)			3.5	

3.4 Conclusions

In May 2001, the White Store Mitigation Site was planted with approximately 6,000 saw grass plants. Only three-fourths of the site was planted due to the saw grass availability at that time. In May 2002, the entire site was replanted with approximately 9,000 saw grass plants. In April 2003, the entire site was tilled and replanted with approximately 9,700 saw grass plants. Very little success has been achieved with respect to the saw grass replanting. It appears that an *Echinochloa* species is covering the majority of the site.

The site will be surveyed this year to ensure that the elevation is the same as the reference site. NCDOT will also take soil samples at the reference site and the mitigation site to compare the soil conditions.

Phragmites have been noted in small portions on the site. NCDOT has treated the site for the past two years to keep the phragmites under control.

NCDOT will continue vegetation monitoring at the White's Store Mitigation Site.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

For the 2003-year, the two surface gauges met the success criteria by exhibiting frequent flooding on the site.

In April 2003, the entire site was tilled and replanted with saw grass. The site is experiencing difficulty achieving success with respect to the saw grass replanting. It appears that an *Echinochloa* species is covering the majority of the site.

The site will be surveyed this year to ensure that the elevation is the same as the reference site. NCDOT will also take soil samples at the reference site and the mitigation site to compare the soil conditions.

NCDOT will continue to monitor hydrology and vegetation at White's Store Mitigation Site.

APPENDIX A

GAUGE DATA GRAPHS

APPENDIX B

SITE PHOTOS AND VEGETATION PLOT/ MONITORING GAUGE MAP

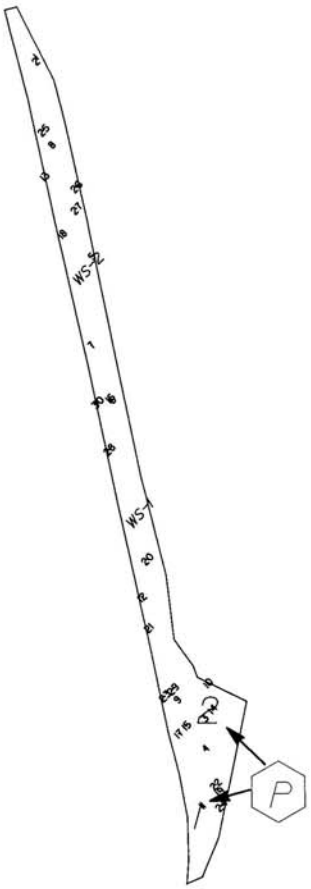
White Store

Photo 1

Photo 2

2003

WHITE STORE MITIGATION SITE
Photo and Random Plot Locations



P PHOTO LOCATIONS

RANDOM PLOT LOCATIONS